

The Sound Chip

GIACCESS

The sound chip on the ST is the General Instruments AY-3-8910. The capabilities of the chip range from pure tones, noise or a specific waveform called the ADSR envelope. The chip has 16 8-bit registers.

For pure tones (a specific frequency) do the following in any order:

- (1) Set Frequency of channel
 Giaccess (100,128) ; /* 12-bit # in channel A */
 Giaccess (10,129) ; /* frequency register */
- (2) Set Volume Level
 Giaccess (8,136) ; /* Put volume 8 in channel A */
- (3) Enable Pure tone
 Giaccess (254,135) ; /* Tone A in Voice/Enable register */

The 12-bit number divides a clock frequency of 125 khz providing a range of 125 khz to 30 hz. The lower 8-bits is formed by register 128 and the upper 4-bits by the register 129.

For noise:

```
Giaccess (10,134) ; /* Set Noise Period */  
Giaccess (247,135) ; /* Enable Noise */
```

For waveform selection of the ADSR:

```
Giaccess (16,136) ; /* Set volume to 16 */  
Giaccess (100,139) ; /* Set Envelope Period */  
Giaccess (0,140)  
Giaccess (14,141) ; /* Set Waveform Shape */
```

For note playing: The following can be used to hold a note:

```
/* delay using the 200hz timer */  
    move.l   #timer,(sp)           ; Supexec call  
    move.w   #38,-(sp)  
    trap     #14  
    bra      over  
timer:   move.l   #$4ba,a0           ; 200hz timer  
        move.l   (a0),d0           ; get timer value  
        add.l    #1,d0           ; 1/200th of a sec.  
wait:    cmp.l    (a0),d0  
        bge      wait  
        rts  
over:
```

To turn on a note: use one of two ways:

- (1) Enable channel by Voice/Enable register
- (2) Vary Volume by register to some non-zero number

To read a register:

```
note_val = Giaccess (0,b) ; /* note_val contains value of register b. */
```

To write a register:

```
Giaccess (c,b+128) ; /* c is 8-bit value written to register b */
```

Reference Chart

register	description	bit placement								write code
		7	6	5	4	3	2	1	0	
0	Channel A Frequency	8 bit fine tune - A								128
1		4 bit coarse-A								129
2	Channel B Frequency	8 bit fine tune - B								130
3		4 bit coarse-B								131
4	Channel C Frequency	8 bit fine tune - C								132
5		4 bit coarse-C								133
6	Noise Period	5 bit period control								134
7	Voice/ Enable	1	1	Noise-0			Tone-0			135
		IOB	IOA	C	B	A	C	B	A	
8	Volume Channel A				M	4 bit vol. -A			136	
9	Volume Channel B				M	4 bit vol. -B			137	
10	Volume Channel C				M	4 bit vol. -C			138	
11	Envelope Period	8 bit fine tune								139
12		8 bit coarse tune								140
13	Envelope Shape					C	ATT	ALT	H	141
14	I/O Port A	8 bit parallel port								142
15	I/O Port B	8 bit parallel port								143

Gia_state = Giaccess(Gia_state,135); - save state of I/O

Giaccess(A,B) - Read from register, B is register number 0 to 15
 - Write to register, A is register number 0 to 15 plus 128

Frequency for channels is determined by a 12 bit number.

Voice/Enable - channels are turned by a 0
 - proper opening and closing with I/O ports set to one.